WA 2917
11.4.94
8b

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

November 4, 1994

FILE COPY

Reply To
Attn. Of: HW-106

John Stiller
Project Coordinator
Burlington Environmental Inc.
955 Powell Avenue, SW
Renton, Washington 98055-2108

Re: Pier 91 Facility, EPA Identification No. WAD 00081 2917
RFI Report Comments

Dear Mr. Stiller:

Enclosed are the U.S. Environmental Protection Agency's (EPA) comments on Burlington Environmental Inc.'s (BEI) RCRA Facility Investigation (RFI) Draft Report for the Pier 91 facility. BEI must submit responses to EPA's comments within sixty (60) days of receipt of this letter. BEI's response may be in the form of revised pages to the draft report or a new, final report.

If you have any questions, please contact Christy Brown (553-8506) who will be managing EPA oversight of corrective action at Pier 91.

Sincerely,

David Croxton

David Croxton
Environmental Scientist

Enclosure

cc: G. Tritt, Ecology-NWRO
C. Brown, RCRA Permits
D. Hotchkiss, Port of Seattle

The conductance of 105B is an order of magnitude below the other wells. The lack of response in 106B and 122B can be interpreted in two ways, either these wells are located in much lower K sediments than the other wells or they are located in an area where the storage is much higher than the other wells. The boring logs for wells 106B and 122B do not indicate different geologic material with a lower K than any other well in this aquifer. And well 105B, furthest inland is considered to be located in the aquitard.

Since differing K sediments doesn't explain this difference in conductance, the other possibility would be storage differences as the aquifer changes from confined to unconfined conditions. However, this interpretation would contradict the very high barometric efficiencies observed for wells 106B and 122B which indicate smaller storage coefficients than the other wells in this aquifer. Discuss BEI's interpretation of the data in regards to responses in wells 106B and 122B.

7) Vertical Ground Water Flow and Hydraulic Conductivity Testing

The K values presented in the RFI suggest a ratio of 1266/1/23 between the upper sand aquifer, silty sand aquitard, and lower sand aquifer. These ratios are sufficient so ground water flow in the aquitard will be nearly perpendicular to its upper and lower contacts with the sand aquifers above and below the aquitard. Vertical hydrogeologic cross sections were drawn for April, May, and july, 1993 data (on attached figures 4, 5, and 6). The cross section, from south to north, go through wells 108A and B, 122B, 106A and B, 115A and B, 114A, and 105A, and B. The three cross sections have similar patterns of groundwater flow. The groundwater flow in the upper aquifer is nearly horizontal, the flow in the aquitard is strongly downward, and the flow in the lower sand aquifer is generally horizontal toward 122B. It is not clear if the flow around 122B indicates further vertical flow or if the flow is into or out of the cross sections. The attached horizontal contour maps for the deeper aquifer (figures 2 and 3) suggest flow should be out of the section at 122B.

The attached cross-sections do not aid in understanding the lack of response of 122B and 106B during the tidal monitoring. The cross section raise some questions about the ground water flow in the area of 122B and 106B. These wells are acting entirely different than the other deep wells and there appears to be a channeling of ground water flow to the East. As has been suggested in the past, there are indications that ground water pumping or lowering is occurring somewhere in the vicinity of the site. Discuss BEI's interpretation of this information and the evidence for some sort of human induced impacts on groundwater levels.

4.4. The RFI report cannot state that there is a continuous aquitard at this site. Correct these discrepancies between Figure 4.4. and the boring logs.

e) The well log for 115A indicates an elevation of -12.4 for the top of the silty-sand layer, whereas adjacent well 115B indicates the top of this layer at -11.7 and boring 112 is a questionable data point because it was only drilled one foot into the silty-sand layer.

2) The RFI must discuss that ground water flow in the shallow aquifer is highly variable and at times there are reversals in the flow directions.

3) Submitted ground water contour maps did not include water elevation data for W-10. In future contour maps data from this well, W-10 must be included.

4) The RFI must discuss the presence of a ground water mound near well 110 and its affects on ground water flow direction. This mound suggests an area of preferential recharge, most likely from a manmade structure such as water main, sewer, building drains, etc. Discuss possible causes for this water mound in the RFI.

5) TIDAL EFFECTS: Information in the RFI must be modified to incorporate the following information and to correct inconsistencies discussed below.

a) Discuss explanations for why no tidal response was observed for wells 106B and 122B even though tidal responses were observed in well 105B located nearly twice as far inland as these other two wells.

b) Add determination of conductance values and interpretation of the conductance data. EPA determined conductances for the various wells using the following equation:

$$\text{Conductance} = T/S = \frac{0.6 \times T(o)}{T(i)}$$

The conductance values determined are shown below. There is a range of values presented because the determination of conductance is sensitive to lag time [T(i)] and since the time between water level measurements is 30 minutes the lag time could vary up to that time on either side of the real peak.

well	Conductance (ft. Sq./minute
103B	5850 to 2600
104B	3146 to 2184
105B	383
108B	23400 to 5850
115B	4127 to 22866

ATTACHMENT: PIER 91 DRAFT RFI REPORT COMMENTS

1) BEI's description of the stratigraphy needs to be more comprehensive and reflect the greater complexity that exists at the site. EPA notes numerous inconsistencies in the data and description that BEI needs to resolve and describe in the RFI. Overall, the data suggest a discontinuous silty-sand layer. Modify the description of the silty-sand layer in the RFI to reflect these interpretations and modify figure 4.4 appropriately.

Some of the evidence for a discontinuous silty-sand layer include:

a) MW-39 wells installed just West of the site did not encounter the silty sand layer at all. The borings and cross sections completed for building W-390 indicated that the silty layer starts at depths below the ground surface of 5 to 6 feet in four of the five borings. This elevation is about 10' above the silty sand layer encountered in BEI's borings at 112, 104, and 113 (the elevation for the silty layers from these off site borings have been estimated using a ground surface elevation of 5 to 6 feet).

b) The building 390 investigation considered this layer at a depth of 5 to 6' to be the original surface of the cove that was filled. Such an interpretation of the data indicates that the sediments below an elevation of about 1 to -1 would be pre-fill and natural in origin.

c) Well borings for 107, 109, 112, 115A, 116, 117, 118, and 119 encountered a silt layer at approximately a depth of 5 to 6' below the ground surface. Other borings, W-10, 39-2, 114, TB-2, TB-7, SB-1, and SB-2 also indicated a silt layer about 10 feet higher than the surface of the silt-sand layer defined in the RFI.

d) The TB boring data is not included in Figure 4-4. There are also a number of inconsistencies for detection of the silty-sand layer between boring logs and Figure 4.4. These include:

well	boring log (feet)	Figure 4.4 (feet)
111	-15.2	-21.0
122	-15.4	-13.0
106	-12.1	-9.8
121	-12.0	-11.3
105	-14.5	-12.1
109	-15.3	-14.3

These changes have been made on attached figure 1. Figure 1 suggests a much more complicated layer than that in BEI's figure